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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/930,430	08/14/2001	Ramesh Raskar	CR-1341	1539

7590 10/01/2004

Patent Department
Mitsubishi Electric Research Laboratories, Inc.
201 Broadway
Cambridge, MA 02139

EXAMINER	
SANTIAGO, ENRIQUE L	

ART UNIT	PAPER NUMBER
2671	4

DATE MAILED: 10/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/930,430	RASKAR ET AL.	
	Examiner	Art Unit	
	Enrique L Santiago	2671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments (see the amendment filed on April 23, 2004), with respect to the rejection of claims 1-7 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new grounds of rejection is made in view of the article "Shader Lamps", by Raskar, Welch, Low and Bandyopadhyay from Mitsubishi Electric Research Laboratories, disclosed in the Eurographics Workshop on Rendering, London, England, on June 25-27, 2001.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-7 are rejected under 35 U.S.C. 102(a) as being anticipated by the article "Shader Lamps", by Raskar, Welch, Low and Bandyopadhyay from Mitsubishi Electric Research Laboratories.

-Regarding claim 1, "Shader Lamps" teaches a method for registering an image with a 3D physical object (see page 1, the abstract), comprising: acquiring a 3D graphics model of the 3D physical object (see page 6, section 6 "Implementation", first paragraph); identifying a plurality of 3D calibration points on a surface of the object and corresponding 3D model calibration points in the 3D graphics model (see page 6, section 6 "Implementation", second paragraph); illuminating the 3D physical object with a calibration image using a projector at a

fixed location with respect to the 3D physical object, the calibration image including a plurality of pixels (see page 6, section 6 "Implementation", second paragraph); aligning the calibration image with each of the 3D calibration points on the surface of the 3D physical object to identify corresponding 2D calibration pixels in the calibration image (see page 6, section 6 "Implementation", second paragraph, and page 4, section 4.1 "Authoring and Alignment" second paragraph); and determining a transformation between the 2D calibration pixels and the corresponding 3D calibration points of the model to register the projector with the 3D physical object (see page 6, section 6 "Implementation", second paragraph, and page 4, section 4.1 "Authoring and Alignment" second paragraph).

-Regarding claim 2, "Shader Lamps" further teaches rendering the 3D graphics model using the transformation to generate an image (see page 6, section 6 "Implementation", second paragraph, and page 4, section 4.1 "Authoring and Alignment" second paragraph); and illuminating the 3D physical object with the image using the projector at the fixed location (see figs. 2, 6 and 7).

-Regarding claim 3, "Shader Lamps" further teaches a method including at least six 3D calibration points (see page 6, section 6 "Implementation", second paragraph).

-Regarding claim 4, "Shader Lamps" further teaches a method wherein the transformation includes a projector transformation matrix and a viewer transformation matrix (see fig 3, pages 2 and 3, section 3 "The illumination Process").

-Regarding claim 5, "Shader Lamps" further teaches a method wherein the calibration image includes a cross hair (see fig. 8, page 6, section 6 "Implementation", second paragraph),

and aligning the cross hair with the 3D calibration points using an input device couple to the projector (see fig. 8, page 6, section 6 "Implementation").

-Regarding claim 6, "Shader Lamps" further teaches illuminating the 3D physical object with a plurality of calibration images using a plurality of projectors at a plurality of corresponding fixed locations (see figs. 6 and 7, page 1, the abstract, page 6, section 6, "Implementation"); aligning each calibration image with each of the 3D calibration points on the surface of the 3D physical object to identify corresponding 2D pixels in each calibration image (see figs. 3 and 6, page 4, sections 4.1 and 4.2); determining a transformation between the 2D calibration pixels of each image and the corresponding 3D model calibration points to register each projector with the 3D physical object (see fig. 8, page 6, section 6 "Implementation", second paragraph).

-Regarding claim 7, "Shader Lamps" further teaches rendering the 3D graphics model using each transformation to generate a plurality of images (see figs. 3, 6 and 7, pages 2-4, section 3 "The Illumination Process" and page 6, section 6 "Implementation", second paragraph); and illuminating the 3D physical object with the image in parallel using the plurality of projector at the plurality of fixed location (see figs. 3, 6 and 7, pages 2-4, section 3 "The Illumination Process").

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US patent no. 6,175,655 B1: US patent no. 6,515,658 B1: US patent no. 6,639,594 B2

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Enrique L Santiago whose telephone number is 703 306-5908. The examiner can normally be reached on Monday to Friday from 7:00 A.M. to 3:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman whose telephone number is 703 305-9798, can be reached on Monday to Friday from 7:00 A.M. to 3:30 P.M.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

703 872-9306 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Enrique L. Santiago

September 29, 2004

MARK ZIMMERMAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600